

Hawley's Condensed Chemical Dictionary

ELEVENTH EDITION

Revised by

N. Irving Sax
and

Richard J. Lewis, Sr.

 VAN NOSTRAND REINHOLD
New York

In fond memory
of
our good friend
Gessner G. Hawley

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Library of Congress Catalog Card Number 86-23333
N 0-442-28097-1

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Printed in the United States of America

Van Nostrand Reinhold
111 Fifth Avenue
New York, New York 10003

Van Nostrand Reinhold International Company Limited
15 Fetter Lane
London EC4P 4ET, England

Van Nostrand Reinhold
11 Trobe Street
Melbourne, Victoria 3000, Australia

Van Nostrand Reinhold
111 Birchmount Road
Scarborough, Ontario M1K 5G4, Canada

13 12 11 10 9 8 7 6 5 4

Library of Congress Cataloging-in-Publication Data

Condensed chemical dictionary.
Hawley's condensed chemical dictionary.

Rev. ed. of: The Condensed chemical dictionary.
10th ed./rev. by Gessner G. Hawley, 1981.

I. Chemistry—Dictionaries. I. Hawley, Gessner
Goodrich, 1905– II. Sax, N. Irving (Newton Irving)
III. Lewis, Richard J., Sr. IV. Title.

DS.C5 .H87 1987 540.321 86-23333
ISBN 0-442-28097-1

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"Skylol." TM for a series of fire-resistant air-
craft hydraulic fluids. 500-A Used for hydraulic
systems in turbo jet and turbo prop aircraft,
which must operate at -54C. 7000 Used in air-
craft cabin superchargers, expansion turbines for
air-conditioning systems and the aircraft hydrau-
lic system itself.

slack. (1) Descriptive of a soft paraffin wax result-
ing from incomplete pressing of the settlings from
the petroleum distillate. Though it has some ap-
plications in this form, it is actually an intermedi-
ate product between the liquid distillate and the
scale wax made by expressing more of the oil.
See also scale (2).

(2) Specifically, to react calcium oxide (lime)
with water to form calcium hydroxide (slaked
or hydrated lime), the reaction is $\text{CaO} + \text{H}_2\text{O}$
 $\rightarrow \text{Ca}(\text{OH})_2 + \text{heat}$. The alternate spelling
"slake" has the same meaning.

slafamine. (1-acyloxy-8-aminooctahydroindoli-
zine). An alkaloid derived from a fungus
that infests clover. It is under research develop-
ment for use as an agent in retarding cystic
fibrosis.

slag. (dross; cinder). (1) Fused agglomerate
(usually high in silicates) which separates in
metal smelting and floats on the surface of mol-
ten metal. Formed by combination of flux with
gangue of ore, ash of fuel, and perhaps furnace
lining. Slag is often the medium by means of
which impurities may be separated from metal.
(2) The residue or ash from coal gasification
processes, it may run as high as 40% depending
on the rank of coal used.

Use: Railroad ballast, highway construction, ce-
ment and concrete aggregate, raw material for
Portland cement, mineral wool, and cinder block.

slake. See slack.

CAS: 83-34-1.

a substance browning
p 93-95C, bp 265C,

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"SMENTOX"

as components of useful products, e.g., (1) in
steel manufacturing, (2) in roofing and road
treatment compositions, and (3) as a base for
fertilizers.
See also sewage sludge.

"Sludge Conditioner." TM for a series of
polyelectrolytes.
Use: Conditions sludge for dewatering and settling
in municipal sewage treatment plants.

slurry. A thin, watery suspension; for example,
the feed to a filter press or to a fourdrinier ma-
chine; also a stream of pulverized metal ore. A
special use of this term refers to a type of explo-
sives called "slurry blasting agents" based on
gelatinized aqueous ammonium nitrate, sensi-
tized with various other explosives.

slushing agent. A nondrying oil, grease, or similar
material.
Use: Coat metals to afford temporary protection
against corrosion.

slush molding. A method of molding certain toys
such as doll parts in which a preheated mold
is filled with liquid plastic composition and then
heated until the required wall thickness has
formed. The remaining liquid plastic is then
poured out and the mold heated further at
200-220C until the product has completely set.
The mold is then cooled and the product re-
moved.

Sm. Symbol for samarium.

smalt.

Properties: Blue powder.
Derivation: A potash-cobalt glass made by fusing
pure sand and potash with cobalt oxide, grinding,
and powdering.
Use: Paint pigments, ceramic industries (pigment),
coloring glass, bluing paper, starch and textiles,
coloring rubber.

smectic. A molecular structure (layers or planes)
occurring in some liquid crystals; it imparts a
soft, soapy property. There are nine types of
smectic orientation.

smelting. Heat treatment of an ore to separ-
ate the metallic portion with subsequent reduc-
tion.
See also roasting.

slash pine. A loblolly pine growing in swampy
areas (slashes) in southeastern US.
Use: Primarily for manufacture of kraft paper
pulp.

slate. A fine-grained metamorphic rock which
cleaves into thin slabs or sheets. Color usually
gray to black, sometimes green, yellow, brown,
or red. Slates are composed of micas, chlorite,
quartz, hematite, clays, and other minerals.
Occurrence: Pennsylvania, Vermont, Maine, Vir-
ginia, California, Colorado, Europe.
Use: Roofing, blackboards; (as powder) filler in
paint, rubber, abrasive.

slate black. See mineral black.

slate flour. Finely divided slate used as a filler
and dusting agent in rubber, plastics, etc.

slate, green. See slate flour.

slave. A remote-controlled mechanism or instru-
ment that repeats the action of an identical mech-
anism that is controlled by an operator in another
location; it may be activated by electromagnets
or by electronic means. Such devices are used
chiefly in handling or processing radioactive ma-
terials but also have communication uses, as in
the Teleradiograph.

sluticide. A chemical which is toxic to the types
of bacteria and fungi characteristic of aqueous
slimes. Examples are chlorine and its com-
pounds, organomercurial compounds, phenols,
and related substances.

Use: Largely in paper mills and to some extent
in textile and leather industries.
See also biocide.

slip clay. A type of clay containing such a high
percentage of fluxing impurities and of such
a texture that it melts at a relatively low tem-
perature to a greenish or brown glass, thus
forming a natural glaze. It must be fine-grained,
free from lumps or concretions, show a low air-
shrinkage, and mature in burning at as low as
704C.

"Slipstone." TM for fluid silicone compositions
to prevent adhesion of materials to one an-
other.
Use: Food-processing and packaging equipment.

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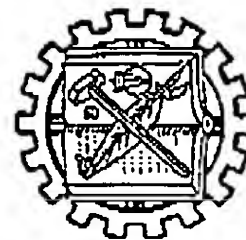
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LONDON

Macmillan & Company, Ltd., St. Martin's Street, London, W.C. 2

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Published simultaneously in Canada by

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Library of Congress Catalogue Card No. 53-10098

PRINTED IN THE UNITED STATES OF AMERICA

PREFACE

THE CHEMISTS' DICTIONARY is designed to provide the widest coverage of the terms in which chemists are most commonly interested. The book includes, therefore, definitions of all the group terms of chemistry, the elements, the ions, the radicals, the type-compounds and of chemical substances are defined in light of present-day nomenclature. The book also gives definitions of the laws, reactions, mathematical equations, fundamental entities; the presentation extends into physics and other sciences as well as necessary to meet the needs of the chemist. Proper names as well as common names—a policy that has been followed not only to the scientific terms, but for the many applications of chemistry.

A feature that facilitates ready reference is the KEY WORD PLATING. Each topic is defined as far as possible in basic terms, and then is important to the explanation that is further defined elsewhere in the book. The applications of chemistry include names of industrial processes and laboratory equipment. Coverage of definitions of the chemical reactions, and reagents is provided. Since very many important tests and as well as laws, equations and reactions, are best known by the names of the men to whom they are accredited, the large number (more than 5000) name entries are a valuable feature of this book. Both the common-name entries and the proper-name terms basic to many phases of pure and applied chemistry are brought together for convenient reference.

While the inclusion of the terms of applied chemistry, even though they number several thousand, has required the most exacting and often arbitrary decisions, the result will be, it is hoped, sufficiently useful to the vast majority of chemists to justify the obvious omissions if the book is viewed from the point of a single, highly specialized field. In fact, the primary object of the Dictionary is to furnish to the specialist in any one field the informal fields up to the level of the specialist. To accomplish this purpose the Dictionary has been written, as far as possible, in the most commonly used atomic entities, for example, are discussed either in the language of mechanics or the "classical language" in accordance with the most usage of the particular term. The same pragmatic viewpoint has been followed in the other editorial policies in the preparation of the book; structural formulas are employed only when necessary to clarify the structure of the compound; the course of the reaction under discussion. The numerical values of the fundamental and derived constants are those deemed the best single

Sludge, Activated

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Soap

SLUDGE, ACTIVATED. See activated sludge.

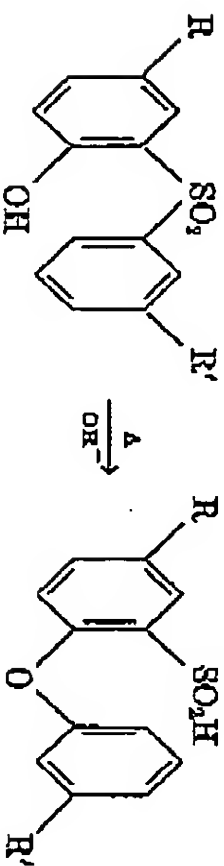
SLURRY. A thin, watery mixture.

Sm Symbol for the element samarium.

SMECTIC PHASE. One of the forms of the mesomorphic state, or the "liquid crystals." In the smectic phase, flow does not occur normally; the substance often forms drops which show a series of fine lines, especially on examination with polarized light. The liquid motion is more of a "gliding" than a flowing action, and x-ray diffraction patterns are obtained in one direction only.

SMEETING. In general, any method of obtaining metals from their ores, which includes fusion; or the fusion operation itself, in which the raw or partly-processed ore is heated in a furnace, with or without added fluxing agents, until the molten metal is separated.

SMILES REARRANGEMENT. A rearrangement of diaryl sulfones, sulfides, ethers, and similar compounds containing, in a position ortho to the groups named above, a hydroxy, amino, or similar group. The rearrangement results in the breaking of the bond between the sulfone, sulfide, etc., group and one of the aryl groups, and the formation of a new bond linking the aryl groups through the hydroxy, amino, or similar, group.



SMITH REAGENT FOR FREE ACIDS. Freshly precipitated silver chloride is dissolved in ammonia and a little of the silver chloride is left undissolved to be certain that the ammonia is fully saturated with silver chloride. This reagent forms precipitates with solutions containing free acids, even very weak acids.

SMITH TEST FOR FORMIC ACID. Add ferric chloride to the neutral solution to be tested. If a red color is produced, add 5 ml. of alcohol per ml. of solution. A precipitate forms if formic acid is present.

SMITH TEST REACTION FOR ALKALOIDS. A few mg. of the alkaloid added to molten antimony trichloride produce the following reactions: brucine, dark red; veratrine, brick-red; aconitine, bronze; narceine, dark green; narcotine, yellow; morphine and codeine, green; thebaine, red.

SMITH TEST REACTIONS FOR CARBAZIDES. A red color develops which is fairly stable for several days, when carbazide or semicarbazide hydrochlorides and diacetyl glyoxime are heated with hydrochloric acid. Heating with diacetyl produces a similar color. A bluish-violet color is produced by adding ammonia.

SMITH TEST REACTION FOR FLUORIDE. Fluorides change ferric thiocyanate solution from deep red to orange or yellow. The color is inversely proportional to the quantity of fluoride present and can be used for quantitative estimation of fluoride, provided interfering substances are not present.

SMOKER. In general, a system of solid particles dispersed in a gaseous medium. The gases resulting from combustion constitute a special case.

SMOLUCHOWSKI EQUATION. See equation, Smoluchowski.

Sn Symbol for the element tin.

SOAP. A compound of one of the higher fatty acids or a mixture of such compounds. The true soaps are salts of the alkali metals

Soap, Metallic

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Solids

and are soluble in water but the term has been extended to include the salts of other metals, some of which are insoluble in water; combinations of fatty acids and certain organic bases, such as ethanolamine; mixtures of the foregoing substances with alkaline silicates, glycerol, and other additives. See also detergent.

SOAP, METALLIC. A compound formed by the reaction of a metal or metal oxide with an organic acid; in other words, a salt of a heavy metal and an organic acid. Metallic soaps are used as driers in the paint industry, and for other industrial purposes.

SOBOLEWA-ZALESKI TEST. A test for aldehydes made by acidifying the solution to be tested with 2-4% hydrochloric acid and adding a filtered aqueous solution of 1-2 g. pyrryl per liter. A turbidity is produced by small quantities of aldehydes, and a red color by larger quantities.

SODA NITRIC PROCESS. An old process (still operated in scattered small or local installations) for the production of oxides of nitrogen, or nitric acid itself, by treatment of sodium nitrate with sulfuric acid.

SODALIC, SODIC, SODIO. Containing or pertaining to the metal sodium.

SODERBERG CELL. A cell for the production of aluminum by electrolysis of alumina dissolved in a bath of molten salts. This cell uses a large electrode, cylindrical in form, which originates as a carbonaceous mixture in a hopper above the cell, and becomes hard and conductive by heating as it moves down into the cell.

SODIUM. Metallic element. Symbol Na (natrium). Atomic number 11. Atomic weight 22.997. Density 0.97. Specific heat 0.253. Melting point 97.5° C. Boiling point 880° C. Valence 1. Oxides Na₂O, Na₂O₂. Sodium occurs in sea water, rock salt, cryolite, borax, etc.

SODYL. The radical—NaO.

SOFTENER. This term is widely used in chemical technology in its common mean-

ing to denote a material or agent added to a product or process the pliability or plasticity of a material. A special usage is in the treatment in which the term "water" applied to a substance used undesirable salts.

SOFTENING TEMPERATURE. A less definite physical constant that does not have a definite point, defined as the temperature at which the viscosity of a material changes to plastic.

SOGASOID. A dispersed system in a gas (see smoke).

SOL. A colloidal solution in which the system is apparently liquid. If continuous phase the system hydrosol. The term sol is also the dispersion medium of a colloid.

SOLATION. In colloidal nomenclature, the process of change from a gel to a sol. The gel is said to solate.

SOLDANI SOLUTION. A 41.0 g. potassium bicarbonate solution, in which 1.5 g. cupric carbonate is dissolved; it is used as a test for glucose, which reduces it.

SOLDER. An alloy which is fused form to join two metallic parts.

SOLID. A state of aggregation of the substance possesses both volume and definite shape. Solids resist any force that tends to change their volume or form. Solids are characterized by very stable surfaces of discontinuity on all sides.

SOLID STRUCTURE. See solid.

SOLIDIFY. To become solid. To pass from the gaseous or liquid to the solid state.

SOLIDUS CURVE. A curve representing the equilibrium between the solid and the liquid phase in a condensed system.